

What is claimed is:

1                   1.     Apparatus for remotely controlling the  
2     position of a camera head, said apparatus comprising, in  
3     combination:

4                             a) at least one hydraulically-actuated  
5     positioner having an output shaft;

6                             b) the angular displacement of said shaft  
7     being responsive to fluid flows transmitted through a pair  
8     of lines coupled thereto;

9                             c) means for coupling said camera head to  
10    said at least one positioner so that the attitude of said  
11    camera head is responsive to the angular displacement of  
12    said output shaft;

13                            d) a valve associated with said  
14    positioner, said valve being coupled to said pair of lines  
15    for controlling said fluid flows;

16                            e) a hydraulic unit for providing fluid  
17    under predetermined pressure to said valve; and

18                            f) means for selectively energizing said  
19    valve to determine said fluid flows.

1                   2.     Apparatus as defined in Claim 1 wherein  
2     said at least one positioner further includes:  
3                   a) a rotational actuator having an  
4     actuator shaft;  
5                   b) the angular displacement of said  
6     actuator shaft being directly responsive to said fluid  
7     flows;  
8                   c) a generally-cylindrical inner housing,  
9     said inner housing having an internal cavity for  
10    accommodating said rotational actuator;  
11                  d) the axis of symmetry of said  
12    generally-cylindrical inner housing being coincident with  
13    that of said actuator shaft;  
14                  e) said inner housing including a  
15    cylindrical main shaft position of reduced diameter at one  
16    end thereof;  
17                  f) means for fixing said actuator shaft  
18    to said inner housing whereby rotation of said inner  
19    housing generates corresponding rotation of said main  
20    shaft.

1                   3.     Apparatus as defined in Claim 2 wherein  
2     said at least one positioner further includes:  
3                   a) a generally-cylindrical outer housing;  
4                   b) said generally-cylindrical outer  
5     housing having a hollow interior for accommodating said  
6     inner housing; and  
7                   c) means for rotatably coupling said  
8     inner housing to said outer housing.

1                   4.     Apparatus as defined in Claim 2 wherein  
2     said rotational actuator further includes:  
3                   a) a substantially-hollow cylindrical  
4     body with an axially-elongated pedestal protruding  
5     inwardly and contacting a section of said actuator shaft;  
6                   b) said section of said actuator shaft  
7     having an axially-elongated radially-directed fin  
8     extending to the inner surface of said substantially-  
9     hollow cylindrical body whereby the interior of said  
10    cylindrical body comprises two chambers;  
11                  c) a wall at one end of said rotational  
12    actuator having two apertures, each of said apertures  
13    being in communication with one of said chambers; and  
14                  d) one of said lines being in  
15    communication with one of said apertures and the other  
16    line being in communication with the other of said  
17    apertures.

1                   5.     Apparatus as defined in Claim 2 wherein  
2     said cylindrical neck is exteriorly-threaded.

1                   6.     Apparatus as defined in Claim 3 further  
2     including a contacting annular seal between the interior  
3     of said outer housing and the exterior of said inner  
4     housing.

1                   7.     Apparatus as defined in Claim 6 wherein  
2     said seal further includes:

3                         a) a pair of outwardly-directed wipers;  
4     and

5                         b) said wipers are axially aligned  
6     adjacent said outer surface of said inner housing.

1                   8.     Apparatus as defined in Claim 3 further  
2     including a pair of contacting, axially-aligned annular  
3     bearing races between the interior of said outer housing  
4     and the exterior of said inner housing.

1                   9.     Apparatus as defined in Claim 8 wherein  
2     each of said bearing races houses a tapered bearing.

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1                   10.   Apparatus as defined in Claim 2 wherein  
2   said means for fixing said actuator shaft to said inner  
3   housing further comprises:

- 4                   a) a tapered collet, said collet  
5   surrounding and being coaxial with said actuator shaft;  
6                   b) means for fixing said collet to said  
7   inner housing; and  
8                   c) means for fixing said tapered collet  
9   to said actuator shaft.

1                   11.   Apparatus as defined in Claim 10 wherein  
2   said means for fixing said tapered collet to said actuator  
3   shaft comprises an inwardly-directed key extending from  
4   the interior of said collet to a groove within the  
5   exterior of said actuator shaft.

1                   12.   Apparatus as defined in Claim 2 further  
2   including:

- 3                   a) the interior of said main shaft  
4   position being substantially hollow;  
5                   b) a substantially-cylindrical plug, said  
6   plug being received within said hollow interior of said  
7   main shaft; and  
8                   c) means for sealing said plug to said  
9   main shaft.

13. Apparatus as defined in Claim 12 wherein  
said means for sealing comprises:

a) an o-ring; and

b) said o-ring being received within an annular groove within the outer surface of said plug.

14. Apparatus as defined in Claim 5 further including:

- a) a mounting structure;
- b) said mounting structure including a substantially-planar plate having an internal aperture for accommodating said cylindrical main shaft; and
- c) an interiorly-threaded nut for securing said plate to said main shaft whereby said mounting structure is rotatable with said main shaft.

15. Apparatus as defined in Claim 14 further including:

a) two positioners;

b) an inclined bracket, the ends of said bracket being fixed to the outer housings of said positioners; and

c) the mounting structure of one of said positioners being fixed to said camera head and the mounting structure of the other positioner being fixed to a camera support structure.